



INVESTOR MEETING

2015 SANTA CLARA



ADVANCING MOORE'S LAW

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Executive Vice President
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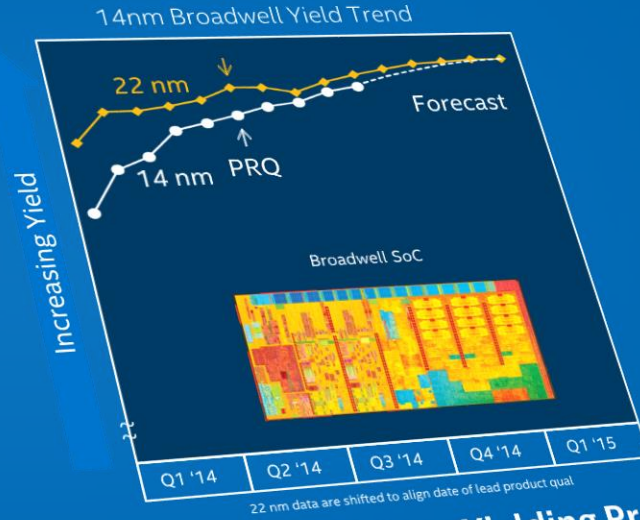


INVESTOR MEETING
2015 SANTA CLARA

AGENDA

- Progress
 - 14nm Update
 - Cost per Transistor Trend
- Economics of Moore's Law
 - What does it take to afford to continue?
- Competitiveness
- Forward looking options

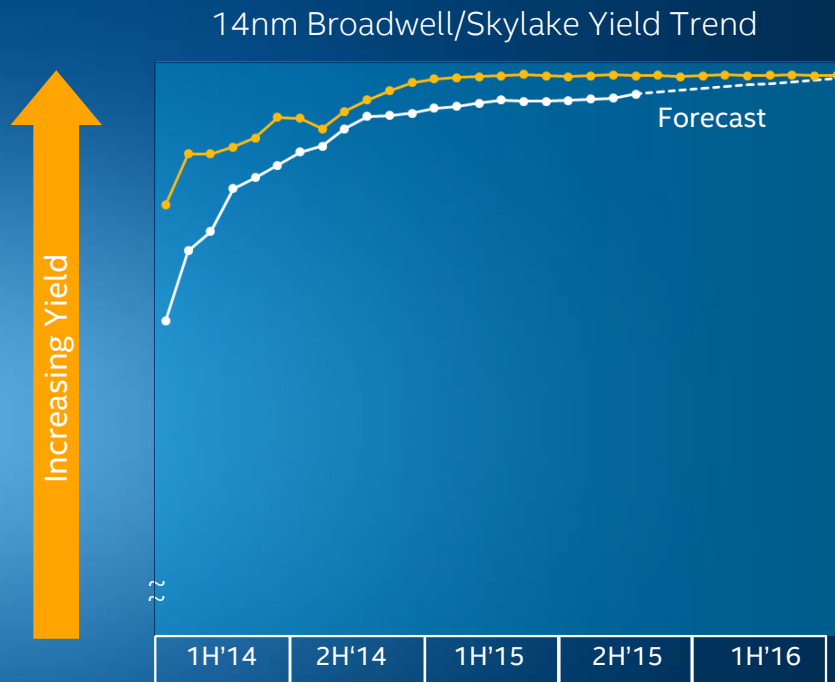
14 NM PRODUCT YIELD IS IN HEALTHY RANGE



22nm Is Intel's Highest Yielding Process Ever

Investor Meeting
2014

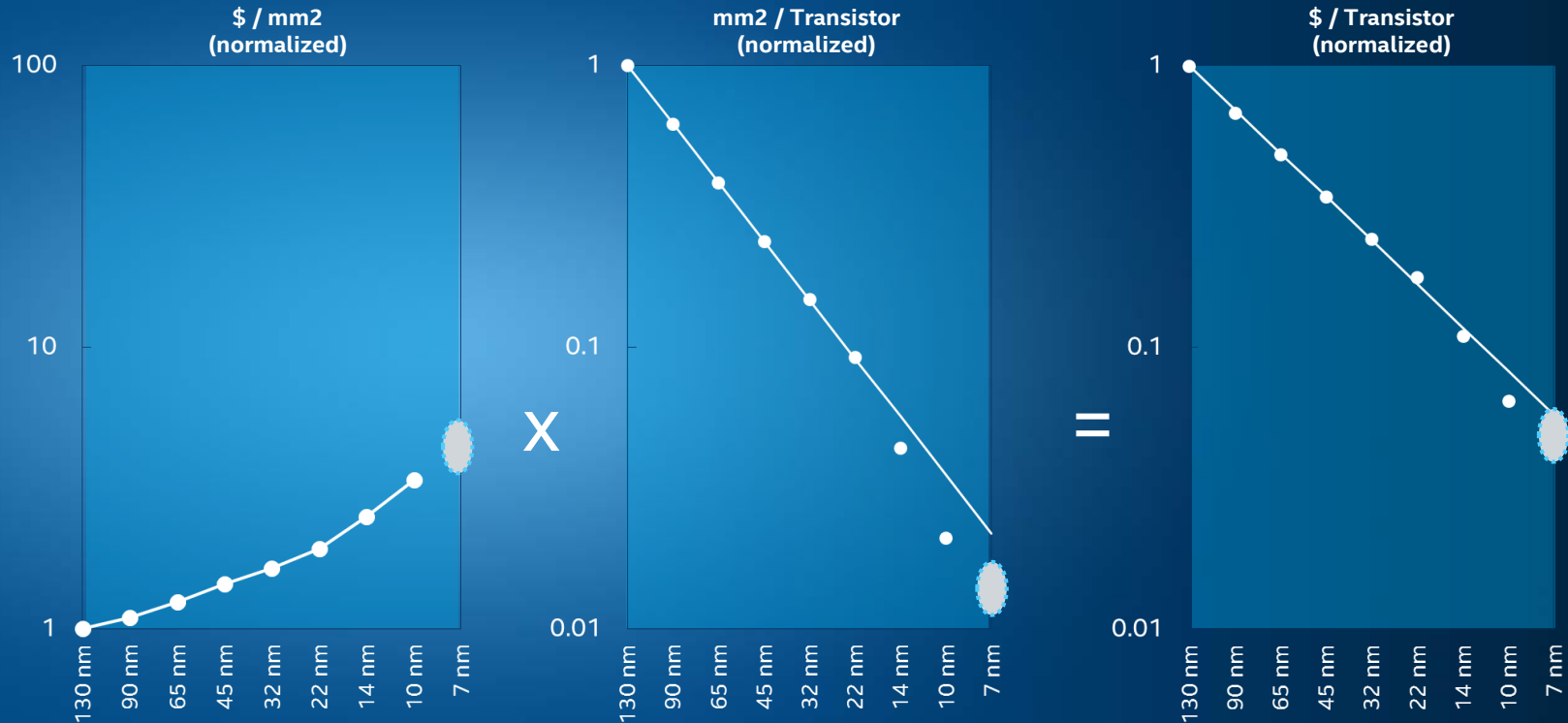
14 NM YIELD IS MATURING



22 nm data are shifted to align date of lead product qual

Trending to match 22nm yields

COST PER TRANSISTOR TREND



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MOORE'S LAW ENABLES INNOVATION AND COST REDUCTIONS



Same circuitry
half the space
(cost reduction)

OR

Twice the
circuitry in the
same space
(architectural
innovation)

=

Option to design
for optimal
performance/cost

ADVANCING PROCESS TECHNOLOGY LOWERS COSTS

Ten Year Model of Manufacturing and Process R & D

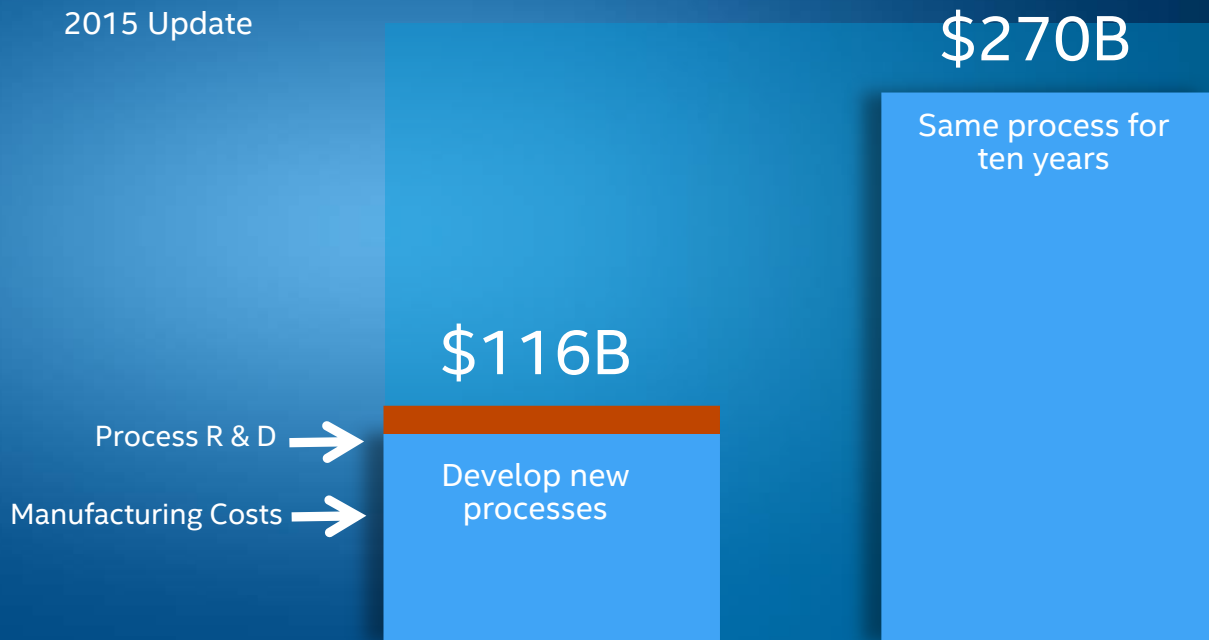


Assumptions are theoretical and not forecasts.

Source: Intel

ADVANCING PROCESS TECHNOLOGY LOWERS COSTS

Ten Year Model of Manufacturing and Process R & D



Assumptions are theoretical and not forecasts.

Source: Intel

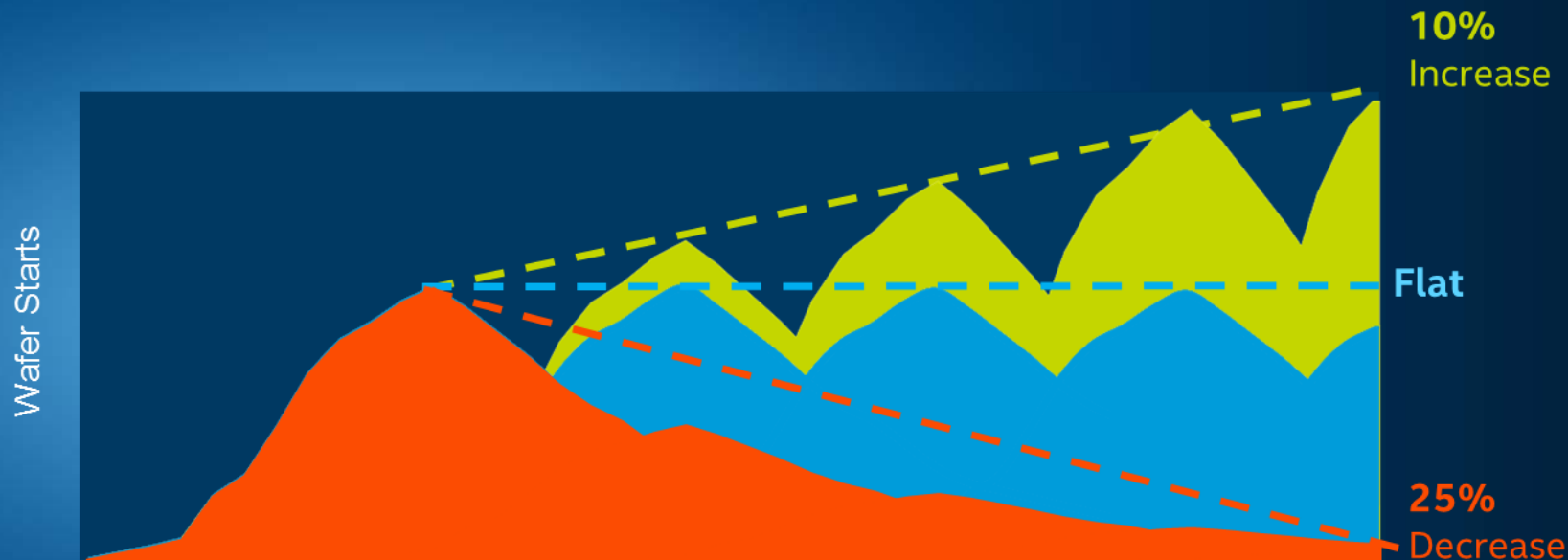
THREE WAYS TO TEST THE MODEL:

Lower unit demand

Higher technology development cost

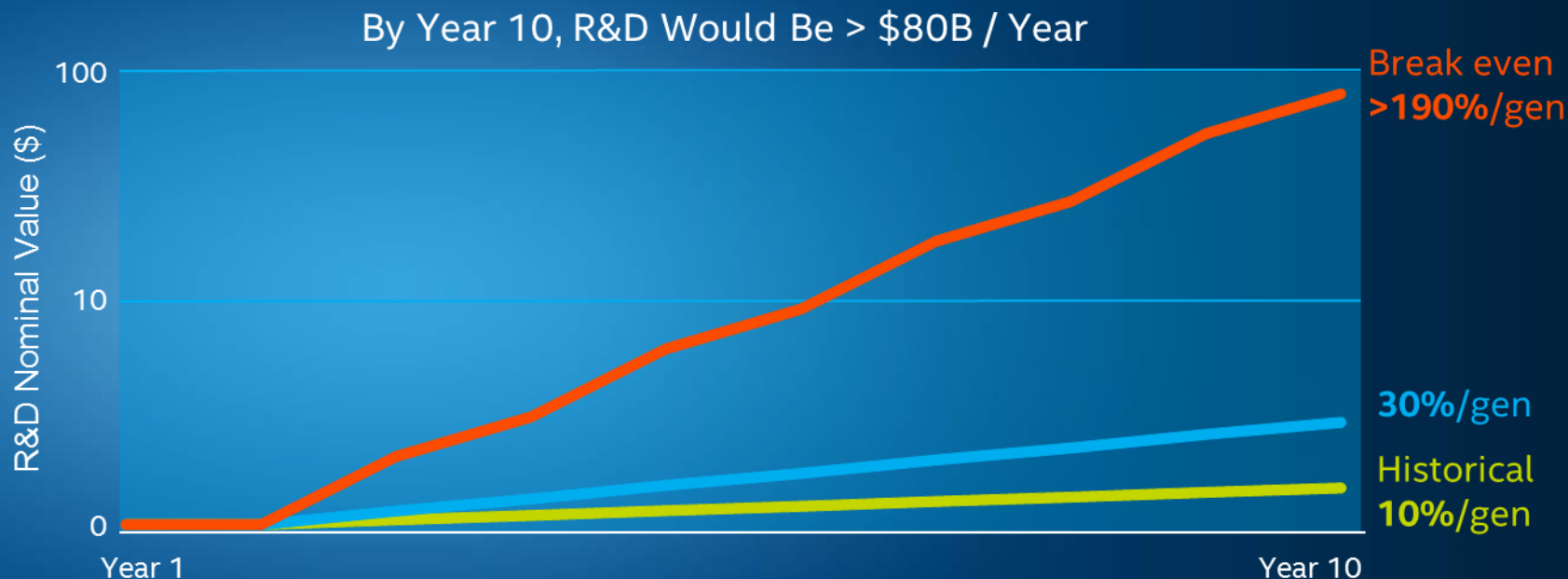
Reduced cost per transistor improvement

THREE WAYS TO TEST THE MODEL: **UNIT DEMAND CHANGES**



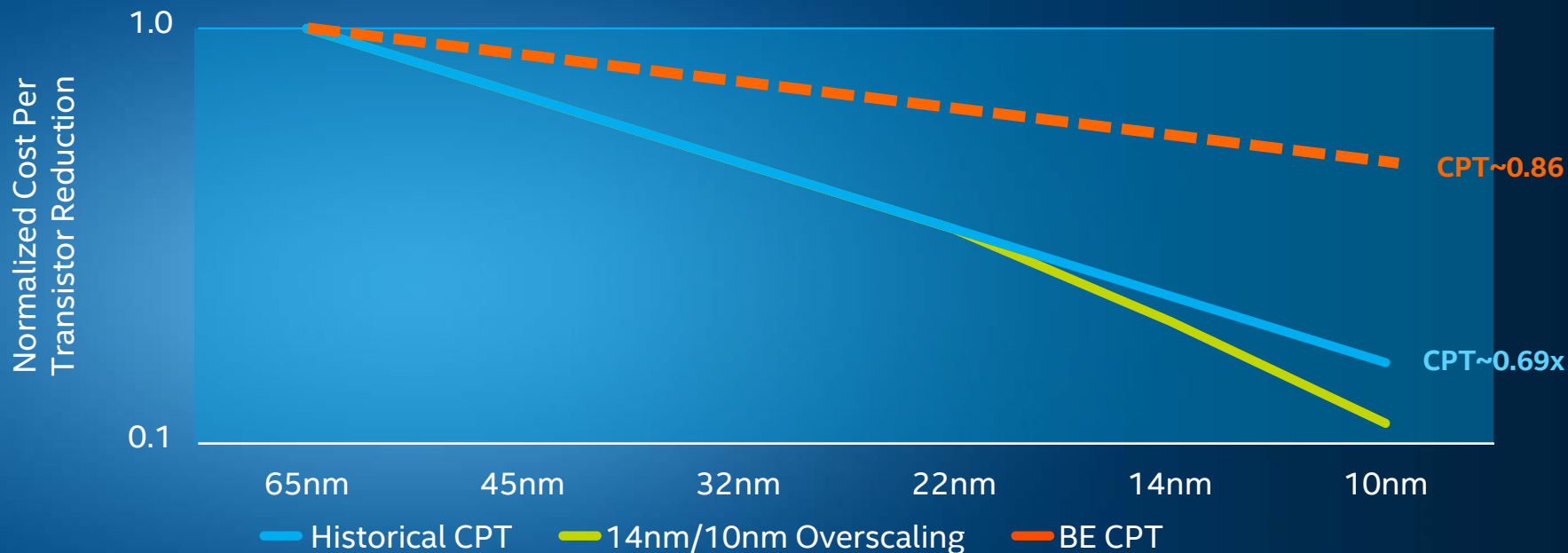
Annual unit demand of -25% over 10 years required to offset economic scaling benefits

THREE WAYS TO TEST THE MODEL: R&D COST INCREASES



Higher R&D investment growth will NOT limit Moore's Law

THREE WAYS TO TEST THE MODEL: CPT IMPROVEMENT REDUCES



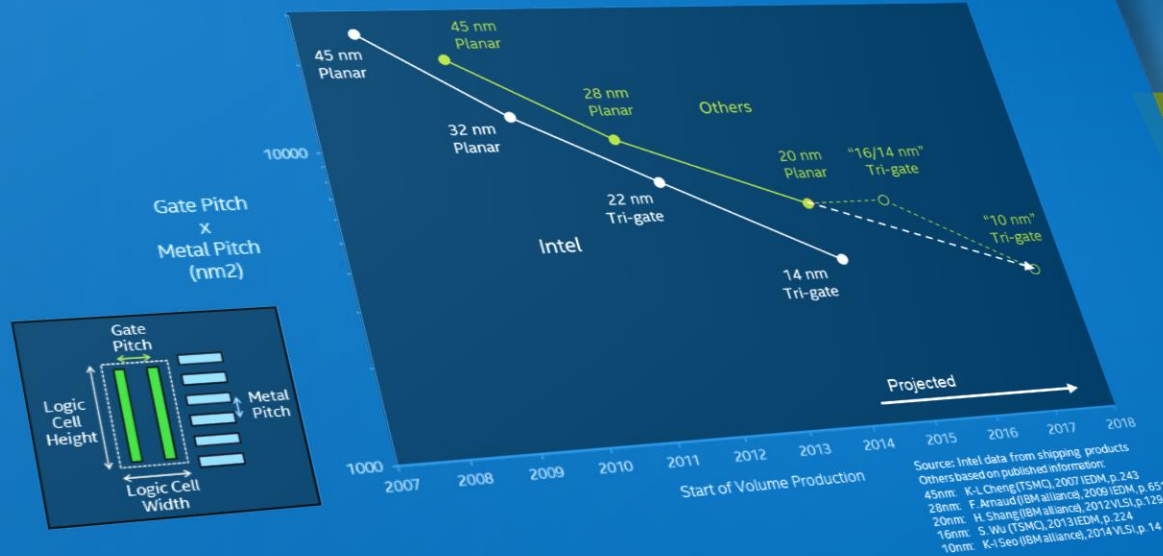
Poorer CPT scaling could challenge economic benefits

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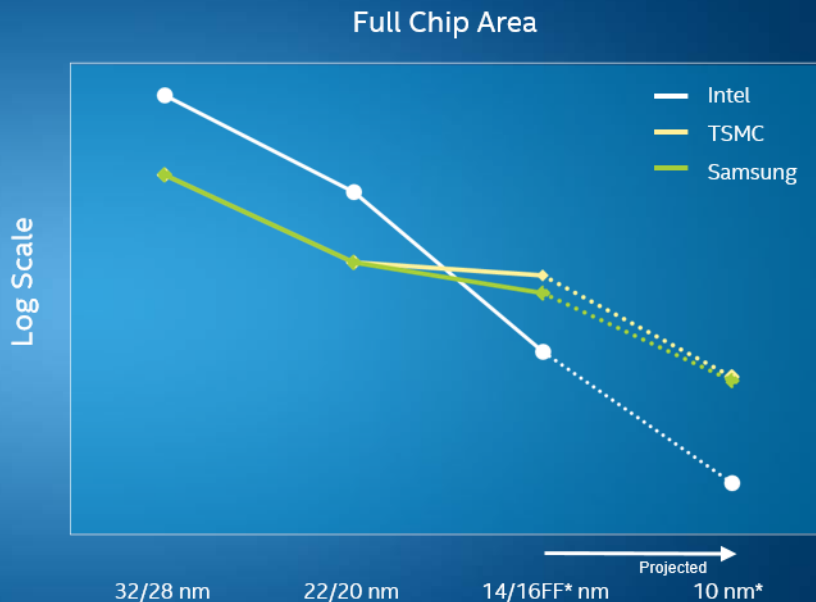
LOGIC AREA SCALING TREND

(Publicly available scaling information)



Investor Meeting
2014

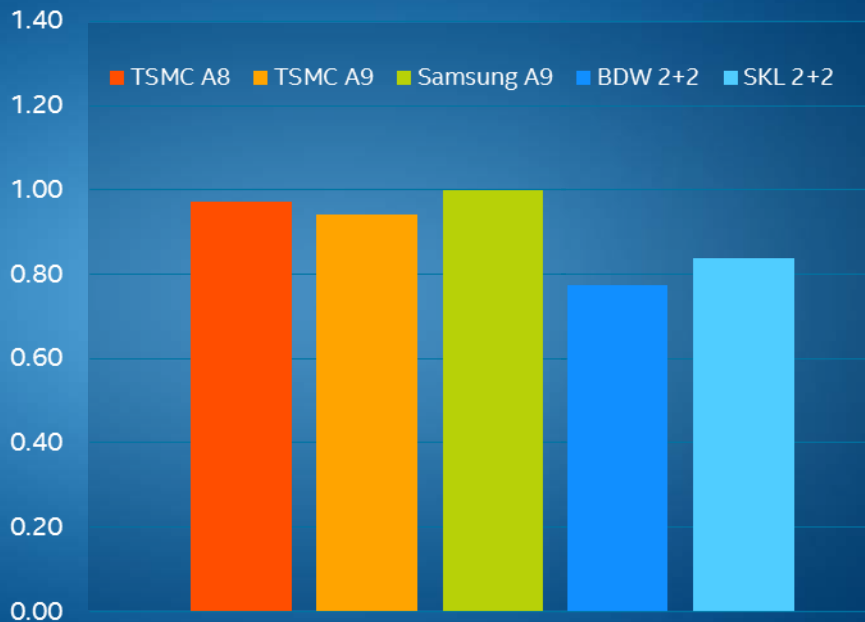
ESTIMATED FULL CHIP SCALING



Updated from
Investor Meeting
2013

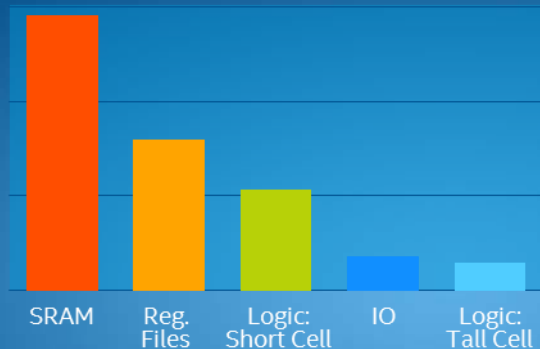
Area scaling estimate includes more of the technology features

TRANSISTOR DENSITY FROM ACTUAL PRODUCTS

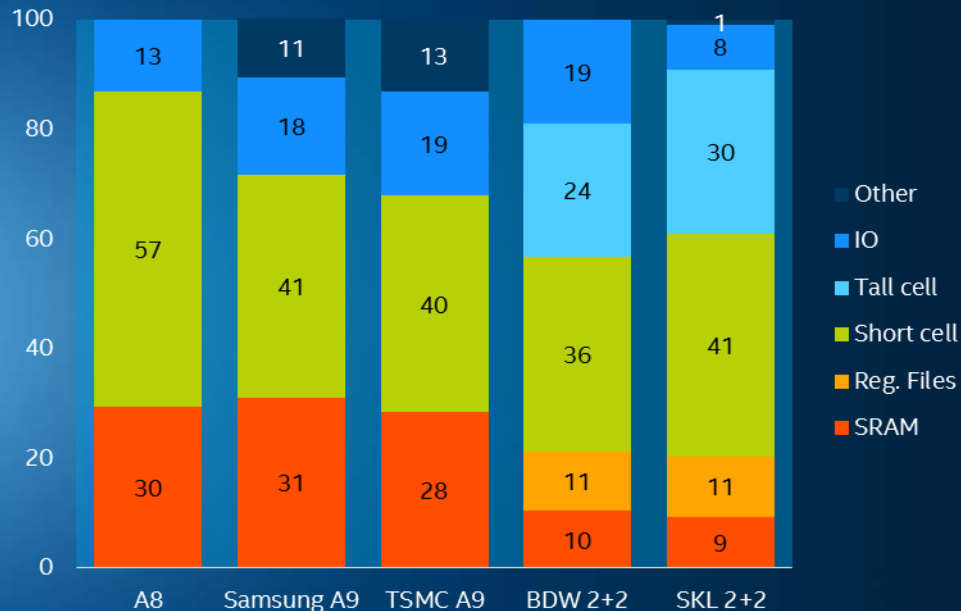


COMPOSITION MATTERS

Relative Transistor Density
(14nm product)

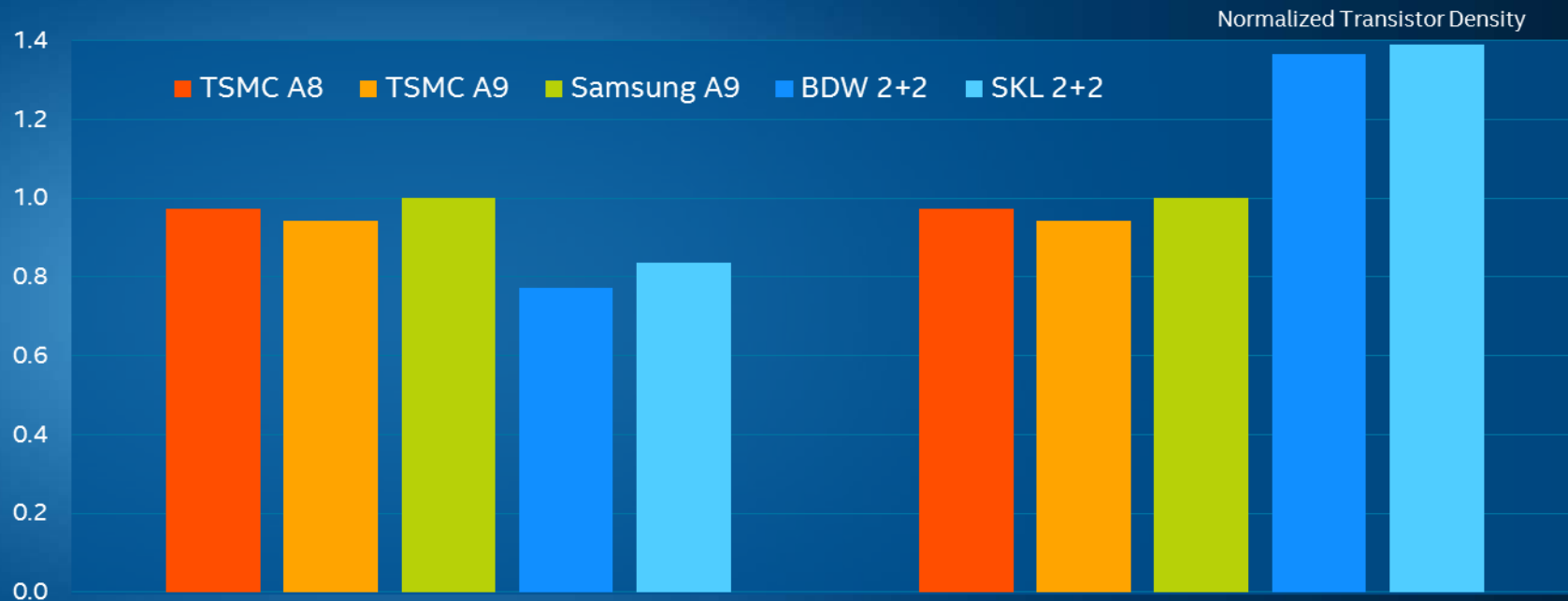


SRAM density = ~ 3X+ of logic
Logic cell choice = ~ 3X



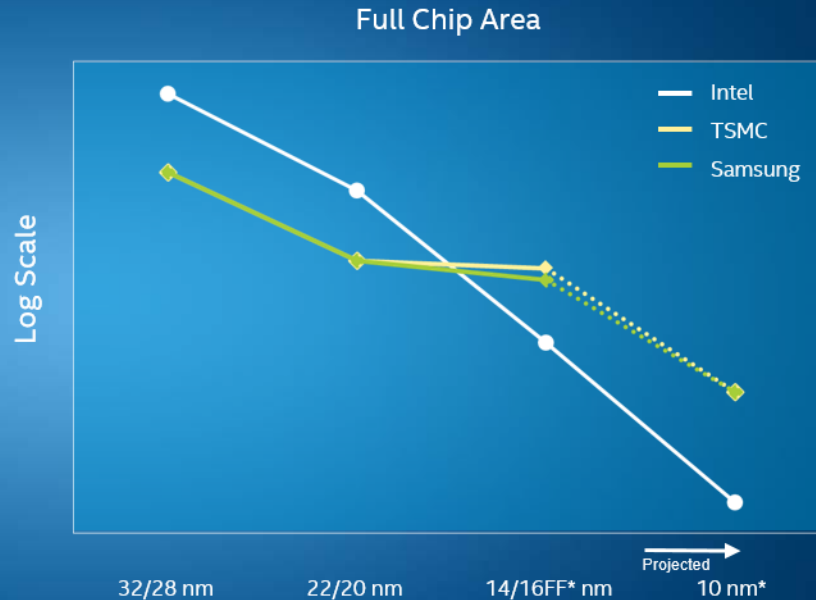
A8/A9 has more inherently dense elements.
Intel has more sparse, higher speed elements.

TRANSISTOR DENSITY NORMALIZED FOR COMPOSITION



Product data demonstrates Intel 14nm advantage

FULL CHIP SCALING UPDATED WITH ACTUAL 14/16NM PRODUCTS

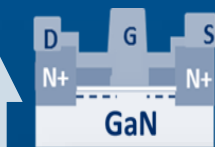


Intel 14nm provides significant density advantage

Sources: TSMC keynote, ARM Tech Con 2012, Oct. 30, 2012, 2014 TSMC Technology Symposium, April 22, 2014, Samsung, Globalfoundries Prep 14nm Process, EE Times 4/17/2014, 2014. 2014 VLSI Technology Symposium abstract - A 10nm Platform Technology for Low Power and High Performance Application Featuring FINFET Devices with Multi Workfunction Gate Stack on Bulk and SOI, Samsung, Global Foundries, et. al. Intel: P1274/P1275 Definition Wrap-up, TMG Technology Density working group, * Projected
Other names and brands may be claimed as the property of others.

FUTURE OPTIONS BEING INVESTIGATED

FUNCTION



High Voltage
RF, mm-Wave

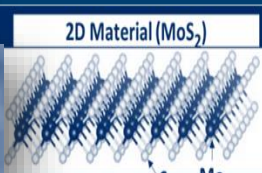


Qubit



Sensors/Actuators

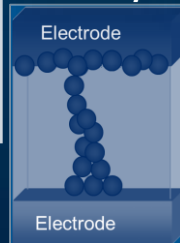
Quantum Computing



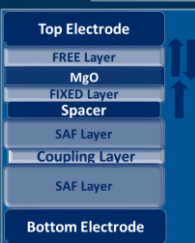
2D Material (MoS_2)



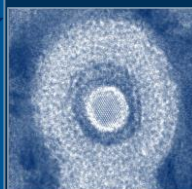
Flexible/Stretchable



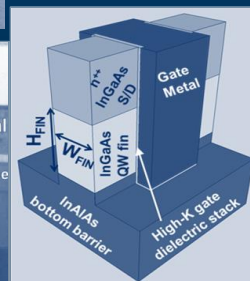
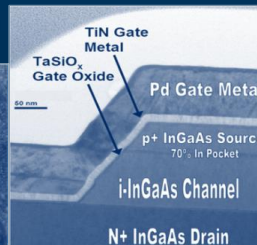
RRAM and STT



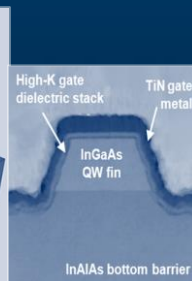
Nanowire



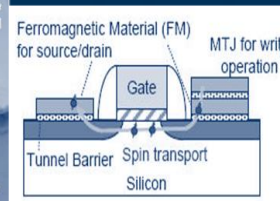
Tunnel FET



III-V



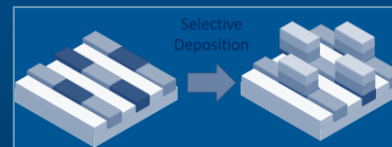
III-V



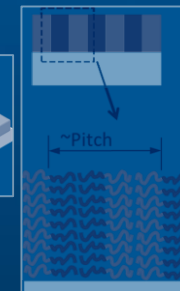
Spin-based



HETEROGENEOUS
INTEGRATION



SELECTIVE
DEPOSITION



DIRECTED
SELF-ASSEMBLY

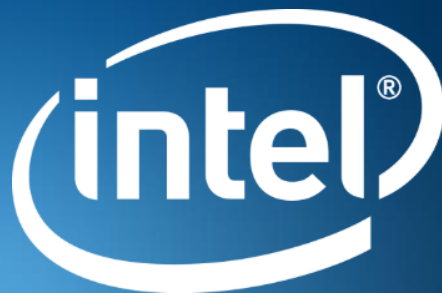
SYSTEM
INTEGRATION

SCALING

Source: Intel

SUMMARY

- 14nm yields, availability and product portfolio MATURING
- Cost per Transistor is difficult, but progress is PROMISING
- Economics of Moore's Law for Intel are SOLID
- Our view of competition is UNCHANGED
- Innovation and change will be required looking forward but....
- The research pipeline is challenging but FULL



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